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(54) Title: NEEDLE POINT GUARD SAFETY CAP ASSEMBLY (54) Titre: ENSEMBLE CAPUCHON DE SECURITE AVEC GAINÉ POUR POINTE D'AIGUILLE		
<p>(57) Abstract</p> <p>Embodiments of a needle point guard safety cap assembly (100) are disclosed, having a needle point cover (110) coupled to an extensible frame (130), which in turn is coupled to a needle hub engaging member (150). Prior to use the needle shaft passes entirely through the needle point cover (110); after use, the extensible frame (130) is urged by the user, causing the cover (110) to slide down the needle shaft until the needle point is retained within the cover (110). The needle point guard safety cap assembly (100) may be integrally formed of a resilient plastic material.</p> <p>(57) Abrégé</p> <p>L'invention concerne différentes forme d'exécution d'un ensemble capuchon de sécurité avec gaine pour pointe d'aiguille. Ces ensembles comprennent une protection (110) de pointe d'aiguille reliée à une structure (130) extensible, elle-même reliée à un élément (150) pouvant être monté sur l'embout de l'aiguille. Avant l'utilisation, la tige de l'aiguille traverse complètement la protection (110) de pointe d'aiguille. Après l'utilisation, l'utilisateur pousse la structure (130) extensible, de manière à faire glisser la protection (110) le long de la tige de l'aiguille jusqu'à ce que la pointe de l'aiguille soit retenue dans la protection (110). Cet ensemble (100) capuchon de sécurité avec gaine pour pointe d'aiguille peut être fabriqué d'une seule pièce dans un matériau plastique souple.</p>		



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<p>(21) International Application Number: PCT/US98/20176 (22) International Filing Date: 23 September 1998 (23.09.98) (71)(72) Applicant and Inventor: KOH, Lawrence, R. [US/US]; 9th floor, 11755 Wilshire Boulevard, Los Angeles, CA 90025 (US). (72) Inventor: ELSON, Edward, E.; 4356 Claytor Circle, Anaheim, CA 92806 (US). (74) Agents: ARANT, Gene, W. et al.; Law Offices of Gene W. Arant, 674 County Square Drive #205, Ventura, CA 93003-5452 (US).</p>		<p>(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p>Published With international search report.</p>
<p>(54) Title: NEEDLE POINT GUARD SAFETY CAP ASSEMBLY</p>		
<p>(57) Abstract</p> <p>Embodiments of a needle point guard safety cap assembly (100) are disclosed, having a needle point cover (110) coupled to an extensible frame (130), which in turn is coupled to a needle hub engaging member (150). Prior to use the needle shaft passes entirely through the needle point cover (110); after use, the extensible frame (130) is urged by the user, causing the cover (110) to slide down the needle shaft until the needle point is retained within the cover (110). The needle point guard safety cap assembly (100) may be integrally formed of a resilient plastic material.</p>		

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FIELD OF THE INVENTION

The present invention relates to the field of hypodermic needles. More specifically the present invention relates to the covering of a hypodermic needle point after use to prevent accidental sticks when disposing of the hypodermic needle.

BACKGROUND OF THE INVENTION

Today, disposable hypodermic needles are an integral part of health care. Typical hypodermic needles include a replaceable plastic sheath which must be removed prior to use and subsequently replaced prior to disposal. The act of replacing the needle cap exposes the user, typically hospital or medical personnel, to accidental needle sticks. An accidental needle stick can transmit diseases through the body's first line of defense - the skin. Because some diseases such as HIV are presently incurable and can ultimately lead to death, the exposed point of a used needle and every needle sheath replacement is potentially life threatening. Although prior devices have addressed this problem, until now an effective and economical device has not been found.

SUMMARY OF THE INVENTION

According to the present invention a needle point cover assembly is provided that securely covers and protects the needle point after a syringe has been used. The assembly preferably includes a cover in the form of an elongated hollow member that is open at one end for receiving the needle therein, and at its other end is

1 mostly enclosed by an end wall having a hole through
2 which the needle can pass. A lid typically encloses the
3 otherwise open end of the cover member. The lid has a
4 hole through which the needle may pass so that the needle
5 may extend through both the lid hole and the hole in the
6 lid wall.

7 When the syringe is being used to make an injection,
8 the needle point must project through the hole in the end
9 wall. An extensible frame that is manually actuatable can
10 be attached to the cover member for moving the cover
11 member along the needle when the syringe is being readied
12 for disposal.

13 After an injection has been made and the syringe is
14 ready for disposal, the cover is then slid to where its
15 end wall is beyond the extremity of the needle point.
16 The cover member can then be supported by the hole in the
17 lid and rotated about the lid hole until the needle point
18 passes inside the enclosed end wall of the cover member
19 into a protected position where it cannot pass through
20 the cover member hole.

21 The needle point cover assembly incorporates several
22 elements to provide tactile and aural feedback to the
23 user to indicate that the needle cover has been
24 successfully deployed. Upon initially coaxing the
25 extensible frame from its non-actuated position, a latch
26 arm member which serves to retain the frame prior to use
27 "snaps" through a slot in the frame; upon full deployment
28 of frame, tabs on the frame "snap" around the needle
29 shaft. The tactile and aural feedback serves to provide
30 reassurance to the user that the needle has been rendered
31 safe without requiring visual inspection of the needle.

32 The latch arm and slot, in addition to providing the
33 user with tactile feedback, insure that once deployment
34 of the needle shield has been initiated, sufficient
35 momentum is present in the finger of the user to complete

1 deployment. To overcome the resistance of the lever arm
2 as it is pulled through the slot, the user must provide
3 enough force against the extensible frame that, once the
4 lever arm clears the slot, deployment is completed in a
5 single motion, without any additional attention by the
6 user.

7 Since the user applies force to the needle shield in
8 a direction which could cause the needle shield to be
9 pushed off the hypodermic entirely if it were not
10 adequately retained in some manner, the preferred
11 embodiment of the needle shield incorporates an annular
12 slot which engages a corresponding annular ring on the
13 hypodermic. In some situations it is also important that
14 cannula opening at the tip of the hypodermic be properly
15 oriented. The preferred embodiment may also incorporate
16 a longitudinal slot to engage a corresponding rib on the
17 hypodermic. In such situations, the needle shield
18 provides an added indication of the cannula orientation.

19 The preferred embodiment is integrally formed of a
20 resilient plastic, making it economical to manufacture.
21
22

23 BRIEF DESCRIPTION OF THE DRAWINGS

24

25 Fig. 1 is a perspective view of one side of the
26 presently preferred embodiment of the needle point guard
27 safety cap assembly.

28 Fig. 2 is a perspective view of the flip-side of the
29 embodiment shown in Fig 1.

30 Fig. 3 is a cross-section at 3-3 of Fig. 1.

31 Fig. 4 is a cross-section at 3-3 of Fig. 1 when the
32 needle point guard safety cap assembly is prepared for
33 attachment to a syringe.

1 Fig. 5 is a cross-section of the presently preferred
2 embodiment of Fig. 1 illustrating the needle point guard
3 safety cap assembly attached to a syringe.

4 Fig. 6 is a cross-section of the presently
5 preferred embodiment of Fig. 1 illustrating the needle
6 point guard safety cap assembly attached to a syringe
7 with a needle sheath covering the needle.

8 Fig. 7 is a cross-section of the presently preferred
9 embodiment of Fig. 1 illustrating the needle point guard
10 safety cap assembly attached to a syringe with the needle
11 sheath removed so that the syringe is ready for use.

12 Fig. 8 is a cross-section of the presently preferred
13 embodiment of Fig. 1 illustrating the needle point guard
14 safety cap assembly attached to a syringe showing how the
15 user actuates the assembly to cover the needle point.

16 Fig. 9 is a cross-section of the presently preferred
17 embodiment of Fig. 1 illustrating the needle point guard
18 safety cap assembly attached to a syringe and depicting
19 the rotated needle point cap covering the needle point
20 and secured in a protected position after use.

21 Fig. 10 is a cross-section at 10-10 of Fig. 9
22 illustrating the clips which secure the needle guard
23 safety cap to the needle when the guard is deployed.

24 Fig. 11 is a perspective view of one side of an
25 alternate embodiment of the needle point guard safety cap
26 assembly.

27 Fig. 12 is a perspective view of the flip-side of
28 the embodiment shown in Fig 11.

29 Fig. 13 is a cross-section at 13-13 of Fig. 11.

30 Fig. 14 is a cross-section at 13-13 of Fig. 11 when
31 the alternate embodiment of the needle point guard safety
32 cap assembly is prepared for attachment to a syringe.

33 Fig. 15 is a cross-section of the alternate
34 embodiment of Fig. 11 illustrating the needle point guard
35 safety cap assembly attached to a syringe.

1 Fig. 16 is a cross-section of the alternate
2 embodiment of Fig. 11 illustrating the needle point guard
3 safety cap assembly attached to a syringe with a needle
4 sheath covering the needle.

DETAILED DESCRIPTION

9 With the needle point guard safety cap assembly of
10 present invention, accidental needle sticks occurring
11 after needle use can be virtually eliminated. To prevent
12 accidental needle sticks, the present invention utilizes
13 a cover or cap or cup-shaped member to cover or contain
14 the point of the needle in a protected position after
15 use.

16 The needle point cover has a hole so that it can be
17 slid along the needle to a stowed position distal from
18 the point prior to injection and then slid back along the
19 needle to cover the point after injection. Once the
20 point of the needle is within the cover after injection,
21 the cover is rotated or skewed so that the needle point
22 can not re-emerge through the hole in the cover. A well
23 chamber formed in the end of the cover serves to capture
24 the end of the needle and prevent it from re-emerging
25 through the hole in the end wall.

26 The needle point cover is typically adapted to
27 receive a typical needle sheath. As such, the needle
28 point guard safety cap assembly typically can be
29 installed prior to sheath installation and needle
30 distribution. Needles can therefore be distributed with
31 the needle point cover stowed distal the point and with
32 the sheath covering the needle in the normal fashion.

33 In preparation for injection, the needle sheath is
34 removed and the syringe is then used in the normal
35 fashion to administer the injection. After injection,

1 the needle point cover can be slid the length of the
2 needle and rotated to prevent re-emergence of the needle
3 point.

4 To facilitate rotation of the needle point cover and
5 to provide a convenient means for sliding the cover along
6 the needle, as well as to facilitate connection to a
7 needle hub or syringe, the needle point guard safety cap
8 assembly may also have a collapsible extension or
9 extendible frame coupled to the needle point cover. The
10 extension or frame can in turn be coupled to an
11 attachment member which is adapted to attach to the
12 needle hub in a non-releasable fashion. The needle hub in
13 turn may be pre-assembled to a syringe or a syringe may
14 be attached to the needle hub prior to use in injecting
15 or withdrawing fluids from a patient.

16 To help retain the needle point cover on the needle
17 hub, the preferred embodiment incorporates an annular
18 groove which mates with a annular ring on the needle hub.

19 During sheath removal prior to injection, typically,
20 the frame in co-operation with the attachment member,
21 retains the needle point cover in its stowed position
22 distal the needle point. In the preferred embodiment, a
23 protrusion on the attachment member engages a slot on the
24 frame; the enlarged end of the protrusion "snaps" through
25 the slot when the needle shield is actuated. After
26 injection, the frame can be manually actuated or urged so
27 that the needle point cover is released to slide toward
28 and eventually cover the point.

29 After the point is contained within the cover,
30 rotation can be made to occur in response to urging of
31 the frame. Once the point of the needle is within the
32 cover, further urging of the frame causes the cover to
33 rotate. The rotated cover prevents the needle point from
34 re-emerging through the hole in the cover by retaining

1 the needle point in a well chamber formed in the cover
2 end wall.

3 As a further assistance to maintaining the
4 rotational position of the cover, the frame typically can
5 be locked or secured to the needle shaft. Securing the
6 frame also prevents the frame from collapsing and
7 allowing the cover to slide back up the needle shaft
8 which further ensures that the needle point can not be
9 re-exposed.

10
11 Installation of the
12 presently Preferred Embodiment

13 The needle point guard safety cap assembly 100 of
14 the present invention can be manufactured of a unitary
15 molded plastic piece to increase reliability and to
16 reduce manufacturing and installation cost. Although not
17 required, the presently preferred embodiment of the
18 present invention is of a unitary molded plastic piece.

19 The present invention is designed to be installed
20 prior to needle use. It typically would be installed on
21 the needle or syringe prior to distribution. The steps
22 necessary to install the presently preferred embodiment
23 are shown by the arrows in Figs. 1 - 5.

24 To install the presently preferred embodiment of the
25 needle point guard safety cap assembly, the syringe.
26 attachment member and the needle point cover must be
27 rotated into position to receive the needle. The syringe
28 attachment member and frame are flexibly coupled. The
29 syringe attachment member or base cup 150 is therefore
30 rotated approximately 90 degrees with respect to the
31 frame 130 so that the needle can extend through the
32 syringe attachment member 150 approximately parallel to
33 the extended frame 130.

34 Next, a lid or enclosing member 118, which is
35 flexibly coupled to the needle point cover 110, is

1 rotated to plug or enclose the cover 110. To help retain
2 the lid to the cover, an annular ring 182 on the lid
3 engages an annular slot 184 on the cover member; the ring
4 and slot may have tapered cross sections to allow them to
5 engage easily, but which make them difficult to separate.

6 The enclosed cover 110, which is flexibly coupled to
7 the frame 130, is then rotated so that the needle can
8 pass through both the hole in it and a hole in the
9 syringe attachment member 150.

10 As the cover is positioned to receive the needle,
11 the frame or segmented extension 130 begins to collapse
12 or fold at a flexible portion between the segments. The
13 cover 110 is then slid along the needle shaft away from
14 the needle point. To assist with this, as well as to
15 position the cup-shaped member prior to needle insertion,
16 a needle sheath 300 can be placed over the cover 110 in
17 order to more easily manipulate the cover 110.

18 As the cover 110 is slid along the shaft, the frame
19 or collapsible extension 130 continues to fold. As the
20 cover closely approaches or contacts the needle hub or
21 syringe, the frame 130 in co-operation with the syringe
22 attachment member 150, releasably retains the cover. In
23 the preferred embodiment, a protrusion 192 with an
24 enlarged head on the syringe attachment member passes
25 through a slot 194 on the frame. The enlarged head of
26 the protrusion is sized such that when appropriate force
27 is applied to the frame the head "snaps" through the
28 slot.

29 By using the sheath 300 to slide the cover 110 down
30 the needle shaft, it too is installed in preparation for
31 distribution. To retain the needle shield to the needle
32 hub, the preferred embodiment incorporates an annular
33 slot 186 on the inside of the attachment member which
34 engages a corresponding annular ring 206 on the needle
35 hub. The ring and slot may have tapered cross sections

1 to allow them to engage easily, but which make them
2 difficult to separate. Sheath 300 removal prior to an
3 injection does not disturb the retained cover 110,
4 however, the frame can be released by the user to actuate
5 the cover.

6
7 The presently Preferred Embodiment

8 Figs. 1-10

9 Figs. 1 - 10 illustrate one embodiment of the needle
10 point guard safety cap assembly 100 of the present
11 invention. It is presently preferred to form the needle
12 point guard safety cap assembly of a unitary plastic
13 piece. As such, Figs. 1 & 2 depict alternate sides of
14 the presently preferred needle point guard safety cap
15 assembly as it appears after it is removed from a mold.
16 Figs. 3 - 10 depict the presently preferred embodiment as
17 it is being prepared for use and in actual use with a
18 syringe.

19 Turning to Figs. 1 & 2, the needle point guard
20 assembly or needle point cover 100 comprises the needle
21 point cap or cup-shaped member or needle point covering
22 means 110 for covering the point of the needle. The
23 needle point cap or cover 110 is shaped in the form of an
24 elongated member having a circumferential wall 112. One
25 end of the elongated member 112 is open while the other
26 is mostly enclosed by a bottom or end wall 116.

27 In the presently preferred embodiment of Figs. 1 &
28 2, the hole or bore 114 in the bottom wall 116 of the
29 needle point cap 110 allows the needle to pass through.
30 The hole 114 is off-centered in the bottom wall, with the
31 a well chamber 126 occupying most of the remaining wall
32 area. A lever arm or rotating means 120 attached to the
33 needle point cap, when urged, causes the needle point
34 cap 110 to rotate about the needle point to prevent the
35 needle point from passing through the hole 114.

1 Figs. 1 & 2 show the enclosing member or top wall or
2 lid 118 that is rotated about the needle point cap-to-
3 enclosing member attachment so as to enclose the needle
4 point cap 110. The enclosing member or enclosing means
5 118 has a bore or hole 122 to allow the needle to pass
6 through. In this embodiment, the enclosing member or
7 needle shaft engaging means 118 acts as a fulcrum which
8 engages the needle. The fulcrum or needle shaft engaging
9 means 118 engages the needle and provides a pivot point
10 used for rotating the needle point cap when the needle is
11 passing through enclosing member hole 122 but not through
12 bottom wall hole 114.

13 In the embodiment shown in Figs. 1 & 2, the needle
14 point guard safety cap assembly 100 is adapted to be
15 attached to the needle hub or syringe. The needle point
16 cap 110 is coupled to the collapsible extension or
17 collapsible member or collapsible segmented extension 130
18 which in turn is coupled to the syringe attachment member
19 or base cup 150. The syringe attachment member 150 is
20 used to connect the needle point guard assembly to the
21 needle hub or syringe. In the presently preferred
22 embodiment, the needle point cap 110 to collapsible
23 member 130 coupling means is by direct coupling.

24 The base cup 150 has a circumferential wall 152 and
25 a bottom wall 154. The bottom wall 154 has the hole 156
26 to allow the needle to pass through. In this particular
27 embodiment, slats 158, which define channels in the
28 inside of the circumferential wall 152 near the bottom
29 wall 154, are included to allow for easy attachment of
30 the base cup 150 to the needle hub. Also included in
31 this embodiment are attachment arms 160 extending from
32 the base cup 150 near the bottom wall 154. The
33 attachment arms 160 are used to couple the base cup 150
34 to the collapsible member 130. The attachment arms 160
35 are flexibly connected to the collapsible member 130.

1 The base cup 150 of the preferred embodiment has an
2 annular slot 186 to engage a corresponding annular ring
3 206 on the needle hub. The ring and slot are tapered in
4 cross-section, making them easy to engage but difficult
5 to separate. The preferred embodiment further includes a
6 longitudinal slot 188 which engages a corresponding
7 longitudinal slot 208 on the needle hub to allow the
8 needle shield to be fixedly rotationally aligned with
9 the cannula opening 220 of the needle.

10 In the presently preferred embodiment the
11 collapsible member or extensible frame 130 has many uses.
12 It is used for connecting the syringe attachment member
13 150 to needle point cover 110 and for releasably securing
14 the needle point cap 110 distal from the needle point.
15 It is also used for sliding the needle point cover 110
16 down the needle shaft and facilitates rotation of the
17 needle point cap 110 about the needle point.
18 Additionally, it assists in maintaining the rotated
19 position of the needle point cover 110.

20 The collapsible segmented extension 130, as shown in
21 Figs. 1 & 2, can be comprised of a wishbone segment 132
22 and a lower segment 140. The wishbone segment 132 has
23 two arms 134 and a base 136. The wishbone arms 134 are
24 flexibly connected to the base cup attachment arms 160.
25 The lower segment 140 has an upper end 142 and a lower
26 end 144. The wishbone segment base 136 is flexibly
27 connected to the upper end 142 of the lower segment 140.
28 A lower end 144 of the lower segment is flexibly
29 connected to the needle point cap 110. Mounted to the
30 lower segment 140 are two clips 148. The wishbone
31 segment 132 forms an opening or means through which the
32 clips 148 can extend when the collapsible segment 130 is
33 folded. It also provides a means for allowing the
34 protrusion 192 on the attachment member to engage the
35 slot 194 when the collapsible segment 130 is folded, as

1 described more fully below. This is more clearly shown
2 in Fig. 6.

3 Fig. 2 shows a pressure platform 146 that ultimately
4 contacts the lever arm 120 and causes rotation of the
5 needle point cap 110. Rotation of the needle point cap
6 110 about the needle point is best shown in Figs. 8 & 9
7 and will be more thoroughly discussed later.

8 Fig. 2 also shows a pair of protruding clips 148
9 that extend from the lower segment 140 to provide a
10 protective position locking means. The clips 148 provide
11 a means to secure the collapsible segmented extension 130
12 to the needle shaft after needle use. Securing the
13 collapsible segmented extension 130 to the needle shaft
14 ensures that the needle point cap 110 maintains its
15 rotated or skewed position and also maintains the
16 protective position of the needle point cap 110 so that
17 it can not slide back up the needle shaft and expose the
18 needle point.

19 Fig. 9 shows one of the clips 148 engaging the
20 needle shaft and securing the collapsible segmented
21 extension 130 to the needle shaft. Fig. 10 is a cross-
22 section through the clip, indicating how they engage the
23 needle shaft.

24 Fig. 3 shows how base cup 150 is rotated in
25 preparation for needle passage through the base cup 150
26 and attachment to the syringe. The Slats 158 provide a
27 means to orient and prevent rotation of the needle within
28 the base cup when a syringe is attached to or separated
29 from a needle seated in the base cup. The base cup or
30 syringe attachment member 150 also has a protrusion 192
31 with an enlarged head. The protrusion releasably engages
32 the slot 194 in the lower segment 140 to provide a
33 locking means when the collapsible extension 130 is
34 collapsed as shown in Figs. 6 & 7.

1 Fig. 3 also shows how the enclosing member 118 is
2 rotated to enclose the needle point cap 110 to form a
3 chamber 128 shown in Fig. 4. In the presently preferred
4 embodiment, the hole or bore 122 in the enclosing member
5 118 has partially beveled edges 124. The partially
6 beveled edges 124 allow the needle point cap 110 to more
7 easily rotate about the needle point as is evident in
8 Fig. 9.

9 In the preferred embodiment shown in Fig. 3, the
10 needle point cap 110 has a well chamber 126 located
11 adjacent to the hole or bore 114. It helps prevent the
12 accidental re-emergence of the needle point through the
13 hole 114 by capturing the needle point after the needle
14 point cap 110 has been rotated about the needle point.

15 Fig. 4 depicts the base cup 150 after rotation and
16 shows the direction of needle insertion in preparation
17 for attachment of the needle point guard safety cap
18 assembly 100 to the syringe. Fig. 4 also depicts the
19 enclosed point cap 110 having the chamber 128. In this
20 presently preferred embodiment, the chamber not only
21 covers the point of the needle but also serves to capture
22 fluid that might exude from the needle point.

23 The arrow adjacent the enclosed needle point cap 110
24 in Fig. 4 indicates the direction the enclosed needle
25 point cap 110 is rotated in preparation for attachment of
26 the needle point guard safety cap assembly 100 to the
27 syringe. Rotation of the base cup 150 and the enclosed
28 needle point cap 110 allows the needle to pass through
29 both of them in preparation for attachment of the needle
30 point guard safety cap assembly 100 to the syringe.

31 Fig. 5 depicts the needle point guard safety cap
32 assembly 100 attached to the syringe 190 in preparation
33 for receiving a needle sheath 300. Although in the
34 presently preferred embodiment it is attached to the

1 needle hub 204, it is also possible to attach it to
2 syringe barrel 202.

3 As shown in Fig. 5, the collapsible extension 130 is
4 beginning to collapse as the needle point guard safety
5 cap assembly is installed in preparation for application
6 of needle sheath 300. Fig. 5 also shows how one of the
7 clips 148 will ultimately extend between the arms 134 of
8 the wishbone segment 132 when the collapsible extension
9 130 is collapsed.

10 Fig. 6 shows the extension 130 collapsed or folded
11 with one of the clips 148 extending between the arms 134
12 of the wishbone segment 132. Both of the clips 148, as
13 is evident from Fig. 6 will extend between the arms 134
14 of the wishbone segment 132 when the collapsible
15 extension 130 is folded.

16 Fig. 5 also depicts the base cup 150 protrusion 192
17 and the slot 194 in the collapsible extension prior to
18 needle sheath 300 application. The arms of the wishbone
19 segment 132 allow the protrusion 192 to engage the slot
20 194.

21 As is evident from Fig. 6 the needle point cap 110
22 is adapted to receive the needle sheath 300 to protect
23 the needle from contaminants prior to use. In the
24 presently preferred embodiment, the enclosing member or
25 top wall 118 abuts the bottom wall 154 of the base cup
26 150 to prevent needle contamination. The syringe with the
27 needle point guard safety cap assembly 100 and the needle
28 sheath 300 installed as depicted in Fig. 6, is as the
29 user would receive it prior to use. To use the syringe,
30 the user simply removes the needle sheath and proceeds to
31 use the syringe in the normal manner depicted by Fig. 7.
32 The protrusion 192 on the attachment member and slot 194
33 in the collapsible extension keep the needle point cap
34 110 from sliding down the needle shaft while the needle
35 sheath 300 is being removed.

1 Subsequent to use, the user simply urges the folded
2 collapsible extension 130 with his finger to dislodge the
3 enlarged head of protrusion 192 from the slot 194. The
4 passage of the enlarged head of the protrusion through
5 the slot provides tactile feedback to the user that the
6 needle shield has actuated; also, in applying sufficient
7 pressure to force the head through the slot, it is
8 assured that the user's finger has sufficient momentum to
9 fully actuate the needle shield.

10 The user then continues to urge the collapsible
11 extension 130 to cause the needle point cap 110 to slide
12 the length of the needle as shown in Fig. 8. In the
13 presently preferred embodiment, as the needle point cap
14 110 nears the needle point, the pressure platform 146
15 nears and ultimately contacts the lever arm 120. After
16 contact, further urging of the collapsible extension 130
17 causes a force to be applied to the lever arm 120.
18 Approximately coincident with contact, the needle point
19 clears the hole 114 and becomes located within the
20 chamber 128. After the needle point has cleared the hole
21 114 the needle point cap 110 rotates about hole 122, and
22 hence about the needle point in response to urging of the
23 lever arm 120. Fig. 9 shows the rotated needle point cap
24 110.

25 As collapsible extension 130 approaches the needle
26 shaft in response to the urging of the user, the clips
27 148 engage or surround the needle so that the collapsible
28 extension 130 is clipped in place as shown in Fig. 9.
29 This provides a means to maintain or secure the rotated
30 position of the needle point cap 110 with respect to the
31 needle point by maintaining engagement of the pressure
32 platform 146 with the lever arm 120 so as to prevent the
33 needle point from re-emerging through the hole 114. It
34 also serves provides a means to keep the collapsible
35 extension 130 from folding and allowing the needle point

1 cap 110 to slide back up the needle shaft thereby
2 exposing the needle point. Therefore, the clips 148
3 provide a means for securing the needle point cover 110
4 in the needle-protective position. The clips also
5 provide additional tactile feedback to the user as they
6 engage the needle shaft.

7 In addition, in the presently preferred embodiment
8 depicted in Fig. 9, the well chamber 126 serves to
9 capture the needle point and prevent it from re-emerging
10 through the hole 114. The well chamber also helps to
11 capture fluid that might exude from the needle point so
12 that it can not easily escape from the needle point cap.
13 Furthermore, in preparation for disposal, needle sheath
14 300 can be placed over the needle point cap 110 for
15 convenience and to ensure the capture of any excess fluid
16 which might leak from the hole 114 in the bottom wall 116
17 of the needle point cap 110.

18
19
20 Description of An Alternate Embodiment

21 Figs. 11-16
22

23 The needle point guard safety cap assembly 400 of
24 the alternate embodiment is also manufactured of a
25 unitary molded plastic piece to increase reliability and
26 to reduce manufacturing and installation cost.

27 To install the alternate embodiment of the needle
28 point guard safety cap assembly, the syringe attachment
29 member and the needle point cover must be rotated into
30 position to receive the needle. The syringe attachment
31 member and frame are flexibly coupled. The syringe
32 attachment member or base cup 450 is therefore rotated
33 approximately 90 degrees with respect to the frame 430 so
34 that the needle can extend through the syringe attachment

1 member 450 approximately parallel to the extended frame
2 430.

3 Next, a lid or enclosing member 418, which is
4 flexibly coupled to the needle point cover 410, is
5 rotated to plug or enclose the cover 410. The enclosed
6 cover, which is flexibly coupled to the frame 430, is
7 then rotated so that the needle can pass through both the
8 hole in it and a hole in the syringe attachment member
9 450. As the cover is positioned to receive the needle,
10 the frame or segmented extension 430 begins to collapse
11 or fold at a flexible portion between the segments. The
12 cover 410 is then slid along the needle shaft away from
13 the needle point. To assist with this, as well as to
14 position the cup-shaped member prior to needle insertion,
15 the needle sheath 480 can be placed over the cover 410 in
16 order to more easily manipulate the cover 410.

17 As the cover 410 is slid along the shaft, the frame
18 or collapsible extension 430 continues to fold. As the
19 cover closely approaches or contacts the needle hub or
20 syringe, the frame 430 in co-operation with the syringe
21 attachment member 150, releasably retains the cover. By
22 using the sheath 480 to slide the cover 410 down the
23 needle shaft, it too is installed in preparation for
24 distribution. Sheath 480 removal prior to injection
25 does not disturb the retained cover 410, however, the
26 frame can be released by the user to actuate the cover.

27 Figs. 11 & 12 depict alternate sides of the
28 alternate embodiment as it appears after it is removed
29 from a mold. Figs. 13 - 16 depict the presently
30 preferred embodiment as it is being prepared for use with
31 a syringe.

32 Turning to Figs. 11 & 12, the needle point guard
33 assembly or needle point cover 400 comprises the needle
34 point cap or cup-shaped member or needle point covering
35 means 410 for covering the point of the needle. The

1 needle point cap or cover 410 is shaped in the form of an
2 elongated member having a circumferential wall 412. One
3 end of the elongated member 412 is open while the other
4 is mostly enclosed by a bottom or end wall 416.

5 In the alternate embodiment of Figs. 11 & 12, the
6 hole or bore 414 in the bottom wall 416 of the needle
7 point cap 410 allows the needle to pass through. A lever
8 arm or rotating means 420 attached to the needle point
9 cap, when urged, causes the needle point cap 410 to
10 rotate about the needle point to prevent the needle point
11 from passing through the hole 414.

12 Figs. 1 & 2 show the enclosing member or top wall or
13 lid 118 that is rotated about the needle point cap-to-
14 enclosing member attachment so as to enclose the needle
15 point cap 410. The enclosing member or enclosing means
16 418 has a bore or hole 422 to allow the needle to pass
17 through. In this alternate embodiment, the enclosing
18 member or needle shaft engaging means 418 acts as a
19 fulcrum which engages the needle. The fulcrum or needle
20 shaft engaging means 418 engages the needle and provides
21 a pivot point used for rotating the needle point cap when
22 the needle is passing through enclosing member hole 422
23 but not through bottom wall hole 414.

24 The needle point cap 410 is coupled to the
25 collapsible extension or collapsible member or
26 collapsible segmented extension 430 which in turn is
27 coupled to the syringe attachment member or base cup 450.
28 The syringe attachment member 450 is used to connect the
29 needle point guard assembly to the needle hub or syringe.
30 In this alternate embodiment, the needle point cap 410 to
31 collapsible member 430 coupling means is by direct
32 coupling.

33 The base cup 450 has a circumferential wall 452 and
34 a bottom wall 454. The bottom wall 454 has the hole 456
35 to allow the needle to pass through. In this particular

1 embodiment, slats 458, which define channels in the
2 inside of the circumferential wall 452 near the bottom
3 wall 454, are included to allow for easy attachment of
4 the base cup 450 to the needle hub. Also included in
5 this embodiment are attachment arms 460 extending from
6 the base cup 450 near the bottom wall 454. The
7 attachment arms 460 are used to couple the base cup 450
8 to the collapsible member 430. The attachment arms 460
9 are flexibly connected to the collapsible member 430.

10 In this alternate embodiment the collapsible member
11 or extensible frame 430 has many uses. It is used for
12 connecting the syringe attachment member 450 to needle
13 point cover 410 and for releasably securing the needle
14 point cap 410 distal from the needle point. It is also
15 used for sliding the needle point cover 410 down the
16 needle shaft and facilitates rotation of the needle point
17 cap 410 about the needle point. Additionally, it assists
18 in maintaining the rotated position of the needle point
19 cover 410.

20 The collapsible segmented extension 430, as shown in
21 Figs. 11 & 12, can be comprised of a wishbone segment 432
22 and a lower segment 440. The wishbone segment 432 has
23 two arms 434 and a base 436. The wishbone arms 434 are
24 flexibly connected to the base cup attachment arms 460.
25 The lower segment 440 has an upper end 442 and a lower
26 end 444. The wishbone segment base 436 is flexibly
27 connected to the upper end 442 of the lower segment 440.
28 A lower end 444 of the lower segment is flexibly
29 connected to the needle point cap 410. Mounted to the
30 lower segment 440 are two clips 448. The wishbone
31 segment 432 forms an opening or means through which the
32 clips 448 can extend when the collapsible segment 430 is
33 folded.

34 Fig. 12 shows a pressure platform 446 that
35 ultimately contacts the lever arm 420 and causes rotation

1 of the needle point cap 410. Pressure platform 446 is
2 adjacent locking surface or locking ledge 449. The
3 locking surface 449 is used to secure the collapsible
4 extension 430 to the base cup 450 when the extension is
5 collapsed. The locking surface 449 will be discussed in
6 more detail later.

7 Fig. 12 also shows a pair of protruding clips 448
8 that extend from the lower segment 440 to provide a
9 protective position locking means. The clips 448 provide
10 a means to secure the collapsible segmented extension 430
11 to the needle shaft after needle use. Securing the
12 collapsible segmented extension 430 to the needle shaft
13 ensures that the needle point cap 410 maintains its
14 rotated or skewed position and also maintains the
15 protective position of the needle point cap 410 so that
16 it can not slide back up the needle shaft and expose the
17 needle point.

18 Fig. 13 shows how base cup 450 is rotated in
19 preparation for needle passage through the base cup 450
20 and attachment to the syringe. The Slats 458 provide a
21 means to orient and prevent rotation of the needle within
22 the base cup when a syringe is attached to or separated
23 from a needle seated in the base cup. The base cup or
24 syringe attachment member 450 also has a protrusion or
25 locking nub 462. The protrusion or locking nub 462
26 releasably engages the locking surface or locking ledge
27 449 to provide a locking means when the collapsible
28 extension 430 is collapsed as shown in Figure 16.

29 Fig. 13 also shows how the enclosing member 418 is
30 rotated to enclose the needle point cap 410 to form a
31 chamber 428 shown in Fig. 14. In this alternate
32 embodiment, the hole or bore 422 in the enclosing member
33 418 has partially beveled edges 424. The partially
34 beveled edges 424 allow the needle point cap 410 to more

1 easily rotate about the needle point as is evident in
2 Fig. 9.

3 The needle point cap 410 has an annular channel 426
4 located around the hole or bore 414. It helps prevent
5 the accidental re-emergence of the needle point through
6 the hole 414 by capturing the needle point after the
7 needle point cap 410 has been rotated about the needle
8 point.

9 Fig. 14 depicts the base cup 450 after rotation and
10 shows the direction of needle insertion in preparation
11 for attachment of the needle point guard safety cap
12 assembly 400 to the syringe. Fig. 14 also depicts the
13 enclosed point cap 410 having the chamber 428. In this
14 alternate embodiment, the chamber not only covers the
15 point of the needle but also serves to capture fluid that
16 might exude from the needle point.

17 The arrow adjacent the enclosed needle point cap 410
18 in Fig. 14 indicates the direction the enclosed needle
19 point cap 410 is rotated in preparation for attachment of
20 the needle point guard safety cap assembly 400 to the
21 syringe. Rotation of the base cup 450 and the enclosed
22 needle point cap 410 allows the needle to pass through
23 both of them in preparation for attachment of the needle
24 point guard safety cap assembly 400 to the syringe.

25 Fig. 15 depicts the needle point guard safety cap
26 assembly 400 attached to the syringe 490 in preparation
27 for receiving a needle sheath 480. Although in this
28 alternate embodiment it is attached to the needle hub
29 494, it is also possible to attach it to syringe barrel
30 492 to provide a means for syringe 490 attachment.

31 As shown in Fig. 15, the collapsible extension 430
32 is beginning to collapse as the needle point guard safety
33 cap assembly 400 is installed in preparation for
34 application of needle sheath 480. Fig. 15 also shows how
35 one of the clips 448 will ultimately extend between the

1 arms 434 of the wishbone segment 432 when the collapsible
2 extension 430 is collapsed. Fig. 16 shows the extension
3 430 collapsed or folded with one of the clips 448
4 extending between the arms 434 of the wishbone segment
5 432. Both of the clips 448, as is evident from Fig. 16
6 will extend between the arms 434 of the wishbone segment
7 432 when the collapsible extension 430 is folded.

8 Fig. 15 also depicts the base cup 450 locking nub
9 or protrusion 462 and the locking surface or locking
10 ledge 449 prior to needle sheath 480 application. The
11 locking nub or protrusion 462 on the base cup 450
12 provides a surface to which the locking ledge or locking
13 surface 449 on the collapsible extension 430 can contact
14 to provide the means for releasable locking. The arms of
15 the wishbone segment 434 allow the locking nub 462
16 contact the locking surface 449. Fig. 16 depicts the
17 locking surface 449 engaging the locking nub 462 when the
18 sheath is covering the needle.

19 As is evident from Fig. 16 the needle point cap 410
20 is adapted to receive the needle sheath 480 to protect
21 the needle from contaminants prior to use. In this
22 alternate embodiment, the enclosing member or top wall
23 418 abuts the bottom wall 454 of the base cup 450 to
24 prevent needle contamination. The syringe with the needle
25 point guard safety cap assembly 400 and the needle sheath
26 480 installed as depicted in Fig. 16, is as the user
27 would receive it prior to use. To use the syringe, the
28 user simply removes the needle sheath and proceeds to use
29 the syringe in the normal manner. The engaged locking
30 nub 462 and locking surface 449 keep the needle point cap
31 410 from sliding down the needle shaft while the needle
32 sheath 480 is being removed.

33 Subsequent to use, the user simply urges the folded
34 collapsible extension 430 with his finger to dislodge the
35 locking surface 449 from the locking nub 462. In this

1 alternate embodiment as the needle point cap 410 nears
2 the needle point, the pressure platform 446 nears and
3 ultimately contacts the lever arm 420. After contact,
4 further urging of the collapsible extension 430 causes a
5 force to be applied to the lever arm 420. Approximately
6 coincident with contact, the needle point clears the hole
7 414 and becomes located within the chamber 428. After
8 the needle point has cleared the hole 414 the needle
9 point cap 410 rotates about hole 422, and hence about
10 the needle point in response to urging of the lever arm
11 420.

12 As collapsible extension 430 approaches the needle
13 shaft in response to the urging of the user, the clips
14 448 engage or surround the needle so that the collapsible
15 extension 430 is clipped in place. This provides a means
16 to maintain or secure the rotated position of the needle
17 point cap 410 with respect to the needle point by
18 maintaining engagement of the pressure platform 446 with
19 the lever arm 420 so as to prevent the needle point from
20 re-emerging through the hole 414. It also serves
21 provides a means to keep the collapsible extension 430
22 from folding and allowing the needle point cap 410 to
23 slide back up the needle shaft thereby exposing the
24 needle point. Therefore, the clips 448 provide a means
25 for securing the needle point cover 410 in the needle-
26 protective position.

27 Annular channel 426 serves to capture the needle
28 point and prevent it from re-emerging through the hole
29 414. The channel also helps to capture fluid that might
30 exude from the needle point so that it can not easily
31 escape from the needle point cap. It is also preferred
32 to have the hole 422 closely surround the needle shaft so
33 that fluid captured in the chamber, can not leak out
34 through the hole 422. Furthermore, in preparation for
35 disposal, needle sheath 480 can be placed over the needle

1 point cap 410 for convenience and to ensure the capture
2 of any excess fluid which might leak from the hole 414 in
3 the bottom wall 416 of the needle point cap 410.
4

5 While only several embodiments of the invention have
6 been described, numerous modifications or other
7 embodiments could be made without deviating from the
8 invention thus described in the following claims.

9 WHAT IS CLAIMED IS:

1 1. A needle point guard safety cap assembly, for
2 securely covering and protecting the needle point of a
3 syringe after the syringe has been used, comprising:

4 a) a syringe attachment member operable to firmly
5 attach the needle point guard safety cap assembly to
6 the needle hub of a syringe;

7 b) a needle point cover member in the form of an
8 elongated hollow member that is open at one end for
9 receiving the needle therein, and at its other end
10 is mostly enclosed by an end wall having a hole
11 through which the needle can pass;

12 c) a lid adapted to close the otherwise open end of the
13 cover member, the lid also having a hole through
14 which the needle may pass so that the needle may
15 extend through both holes;

16 d) an extensible frame having a proximal end and a
17 distal end, the proximal end coupled to the syringe
18 attachment member and the distal end coupled to the
19 needle point cover; the extensible frame being
20 manually actuable for advancing the cover member
21 along the needle to where the end wall of the cover
22 member is beyond the extremity of the needle point;

23 e) the needle point cover member then being supported
24 by the hole in the lid and then, in response to
25 further advancement of the cover member, rotating
26 about the lid hole until the needle point passes
27 inside the enclosed end wall of the cover member
28 into a protected position where it cannot pass
29 through the cover member hole.

30
31 2. A needle point guard safety cap assembly as in
32 Claim 1 wherein the lid is pivotally secured to the cover
33 member; and the syringe attachment member, cover member,
34 lid, and extensible frame are integrally formed of
35 plastic material.

1 3. A needle point guard safety cap assembly as in
2 Claim 1, wherein the cover member further comprises a
3 well chamber formed in the end wall adjacent to the hole
4 for passage of the needle therein, the well chamber being
5 operable for enclosing the sharp end of the needle once
6 the needle point cover has been actuated, thereby
7 preventing the sharp end of the needle from re-emerging
8 through the hole.

9
10 4. A needle point guard safety cap assembly as in
11 Claim 3 further comprising a fulcrum on the needle point
12 cover, with the extensible frame being further operable
13 to act on the fulcrum when the end wall of the cover
14 member is beyond the extremity of the needle point and
15 thereby cause the cover member to rotate such that the
16 sharp end of the needle enters the well chamber.

17
18 5. A needle point guard safety cap assembly as in
19 Claim 1, wherein the extensible frame further comprises a
20 proximal frame segment and a distal frame segment, the
21 frame segments coupled in the center of the extensible
22 frame with a hinge, the hinge being in a closed position
23 prior to actuation of the needle point cover with the
24 proximal and distal frame segments lying substantially
25 parallel to one another, with extension of the frame
26 being achieved by opening the hinge.

27
28 6. A needle point guard safety cap assembly as in
29 Claim 5, further comprising at least one securing clip on
30 the extensible frame, the securing clip being operable to
31 irreversibly engage the needle when the needle point
32 cover is fully actuated.

1 7. A needle point guard safety cap assembly as in
2 Claim 1, further comprising interlocking members on the
3 syringe attachment member and the extensible frame, the
4 interlocking members releasably securing the needle point
5 guard safety cap assembly in its un-actuated state and
6 providing a tactile indication when the needle point
7 guard safety cap assembly is actuated.

8
9 8. A needle point guard safety cap assembly as in
10 Claim 7, wherein the interlocking member on the syringe
11 attachment member comprises a protrusion having a bulbous
12 enlarged end, and the interlocking member on the
13 extensible frame comprises a slot of a width slightly
14 less than the diameter of the bulbous end; the protrusion
15 and slot being positioned on the syringe attachment
16 member and extensible frame, respectively, such that when
17 the needle point guard safety cap assembly is in its
18 unactuated state with the needle point cover member most
19 distal from the needle point the protrusion engages the
20 slot with the bulbous end of the protrusion passing
21 through the slot, whereby the needle shield is releasably
22 maintained in its unactuated state.

23
24 9. A needle point guard safety cap assembly as in
25 Claim 1, wherein the syringe attachment member further
26 comprises at least one annular slot to engage a
27 corresponding annular ring on the needle hub of a
28 syringe.

29

1 10. A needle point guard safety cap assembly as in
2 Claim 1, wherein the syringe attachment member further
3 comprises at least one longitudinal slot to engage a
4 corresponding longitudinal ridge on the needle hub of a
5 syringe to maintain a fixed radial orientation of the
6 needle point guard safety cap with respect to the cannula
7 opening of the syringe.

8
9 11. A needle point guard safety cap assembly as in
10 Claim 1, wherein the needle point cover member is adapted
11 to receive a needle sheath, thereby allowing the needle
12 sheath to cover the needle when the needle point cover
13 member is distal from the needle point.

14
15 12. In a needle point guard safety cap assembly
16 having a syringe attachment member and an extensible
17 frame coupled to the syringe attachment member,
18 a needle point cover coupled to the extensible
19 frame, the needle point cover having the form of an
20 elongated hollow member that is open at one end for
21 receiving the needle therein, and at its other end being
22 mostly enclosed by an end wall having a hole through
23 which the needle can be extended for use, the end wall
24 further having a well chamber to engage and retain the
25 sharp end of a needle when the needle is retracted.

26
27 13. The needle point cover of Claim 12, further
28 comprising a fulcrum member which may be acted upon by
29 the extensible frame of the needle point guard safety cap
30 assembly when the end wall of the cover member is beyond
31 the extremity of the needle point, thereby causing the
32 cover member to rotate such that the sharp end of the
33 needle enters the well.

1 14. In a needle point guard safety cap assembly
2 having (1) a syringe attachment member operable to
3 connect the needle point guard safety cap assembly to the
4 needle hub of a syringe; (2) a needle point cover
5 operable to enclose the needle tip when the needle point
6 guard safety cap is actuated; and (3) an extensible frame
7 having proximal and distal ends, the proximal end coupled
8 to the syringe attachment member and the distal end
9 coupled to the needle point cover,

10 interlocking members on the syringe attachment
11 member and extensible frame operable to releasably lock
12 the needle point guard safety cap assembly in an
13 unactuated state and to provide tactile feedback to the
14 user when the needle point guard safety cap assembly
15 actuation is initiated.

16
17 15. In a needle point guard safety cap assembly
18 having (1) a syringe attachment member operable to
19 connect the needle point guard safety cap assembly to the
20 needle hub of a syringe; (2) a needle point cover
21 operable to enclose the needle tip when the needle point
22 guard safety cap is actuated; and (3) an extensible frame
23 having proximal and distal ends, the proximal end coupled
24 to the syringe attachment member and the distal end
25 coupled to the needle point cover,

26 at least one securing clip on the extensible frame
27 to engage the needle shaft upon activation of the needle
28 point guard safety cap assembly to prevent the needle tip
29 from exiting the needle point cover and to provide
30 tactile feedback to the user when the needle point guard
31 safety cap assembly actuation is completed.

32

1 16. In a needle point guard safety cap assembly
2 having (1) a syringe attachment member operable to
3 connect the needle point guard safety cap assembly to the
4 needle hub of a syringe; (2) a needle point cover
5 operable to enclose the needle tip when the needle point
6 guard safety cap is actuated; and (3) an extensible frame
7 having proximal and distal ends, the proximal end coupled
8 to the syringe attachment member and the distal end
9 coupled to the needle point cover:

10 (a) an inner chamber within the needle point cover
11 operable to contain the needle tip when the needle point
12 guard safety cap assembly is actuated, and a needle entry
13 hole and needle exit hole in communication with the inner
14 chamber, the syringe needle passing through the entry
15 hole, inner chamber, and exit hole prior to actuation of
16 the needle point cover, and then withdrawing from the
17 exit hole upon actuation such that the needle tip is
18 within the inner chamber;

19 (b) a fulcrum integral with the needle point cover
20 and which upon actuation of the needle point guard safety
21 cap assembly contacts the shaft of the needle, the
22 fulcrum operable to cause the needle point cover to
23 rotate with respect to the needle shaft;

24 (c) a lever arm also integral with the needle point
25 cover, the lever arm operable to apply rotational force
26 to the needle point cover; and

27 (d) a pressure platform integral with the extensible
28 frame, the pressure platform operable to apply pressure
29 to the lever arm when the needle point guard safety cap
30 assembly is actuated and the syringe needle tip is within
31 the inner chamber, causing the needle point cover to
32 rotate such that needle tip cannot re-emerge from needle
33 point cover through the exit hole.

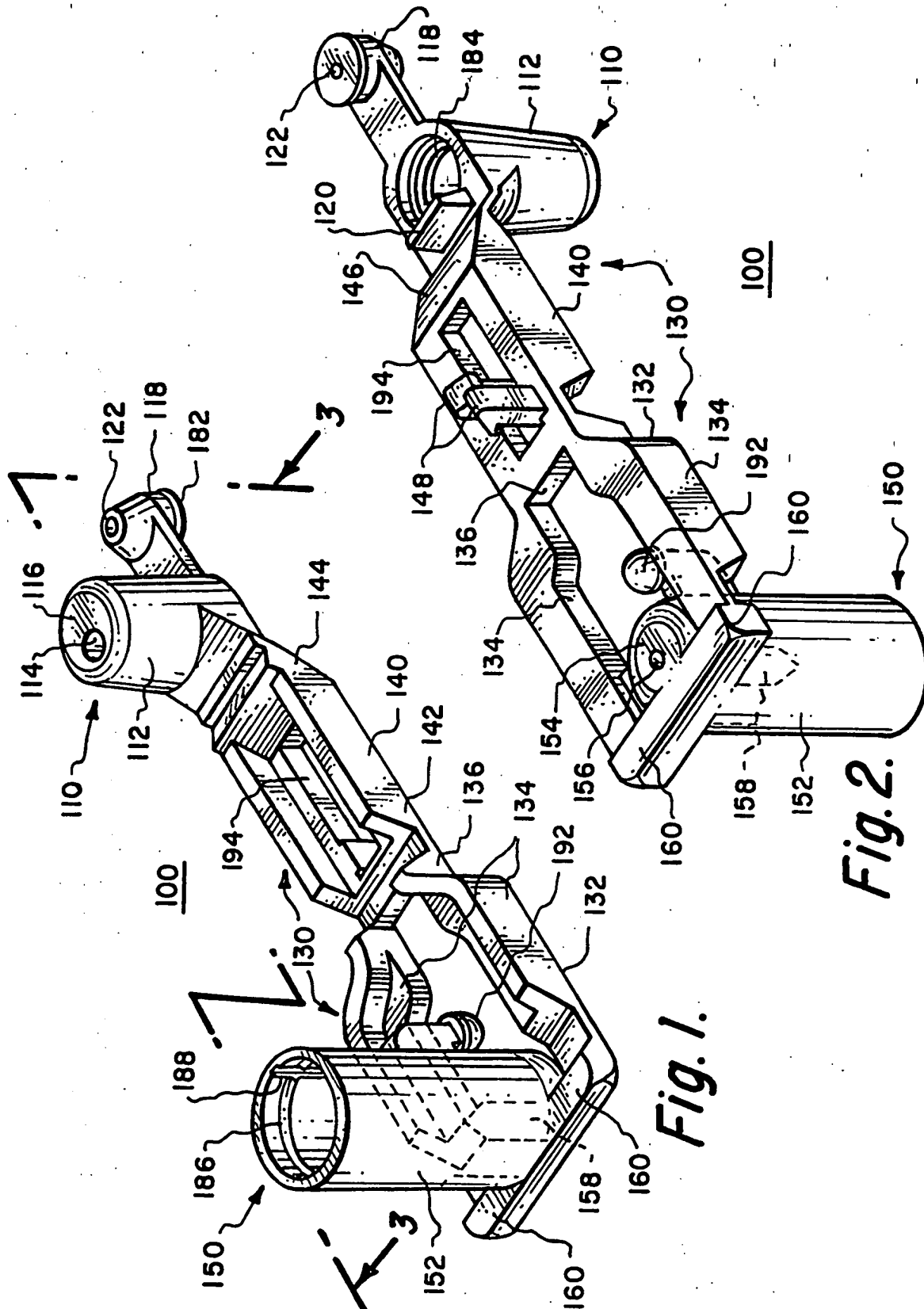
1 17. A needle point guard safety cap assembly for
2 securely covering and protecting the needle point of a
3 syringe after the syringe has been used, comprising:

- 4 a) means for firmly attaching the needle point guard
5 safety cap assembly to the needle hub of a syringe;
6 b) a needle point cover in the form of an elongated
7 hollow member that is open at one end for receiving
8 the needle therein, and at its other end is mostly
9 enclosed by an end wall having a hole through which
10 the needle can pass;
11 c) means for enclosing the otherwise open end of the
12 cover member, but permitting a needle to pass
13 through;
14 d) frame means coupled to the syringe attachment means
15 and the distal the needle point cover means; the
16 frame means being manually actuatable for advancing
17 the cover member along the needle to where the end
18 wall of the cover member is beyond the extremity of
19 the needle point;
20 e) the cover member then being supported by the hole in
21 the lid and, as it advances, rotating about the lid
22 hole until the needle point passes inside the
23 enclosed end wall of the cover member into a
24 protected position where it cannot pass through the
25 cover member hole;
26 f) the needle point guard safety cap assembly being
27 integrally formed.

28
29 18. A needle point guard safety cap assembly as in
30 Claim 17 further comprising manually actuated locking
31 means for securing the cover member in the needle-
32 protective position.

33
34 19. A needle point guard safety cap assembly as in
35 Claim 17 further comprising a means for releasably
36 locking the cover in a position distal from the point.
37

- 1 20. a needle point guard safety cap assembly
2 comprising:
- 3 a) a base cup comprising;
- 4 (i) a circumferential wall with a bottom wall
5 attached thereto for defining a cup,
6 (ii) the cup being adapted to attach to a
7 syringe,
8 (iii) the bottom wall of the cup having a hole
9 therethrough to allow passage of a needle,
10 (iv) a pair of attachment arms extending
11 outward from the circumferential wall near
12 the base cup bottom wall, and
13 (v) a locking protrusion extending from the
14 circumferential wall near the base cup
15 bottom wall;
- 16 b) a collapsible segmented extension having at
17 least two segments comprising:
- 18 (i) a wishbone segment having two arms and a
19 base, the arms being flexibly attached to
20 the base cup attachment arms such that the
21 base cup can rotate about the axis formed
22 by the attachment arms to wishbone
23 connection; and
24 (ii) a lower segment having upper and lower
25 ends, the upper end being flexibly
26 attached to the wishbone base, the lower
27 segment having a locking slot near the
28 lower end for releasably locking the lower
29 segment to the base cup locking protrusion
30 when the segmented extension is collapsed
31 and the lower segment is in a position
32 adjacent the base cup; and
- 33 c) a needle point cap flexibly connected to lower
34 end of the lower segment, the needle point cap
35 comprising:
- 36 (i) a circumferential wall, a top wall, and a
37 bottom wall which define a chamber; and
38 (ii) the top wall and the bottom wall of the
39 needle point cap each containing a bore
40 therethrough to allow passage of the
41 needle.



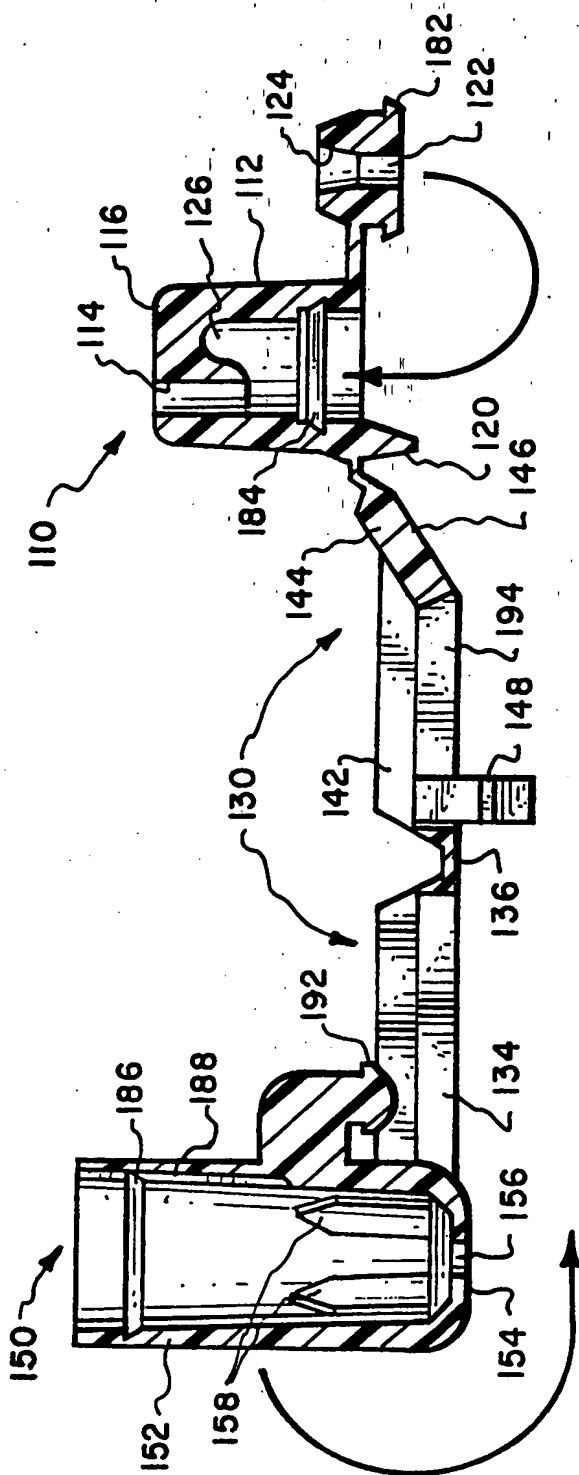


Fig. 3.

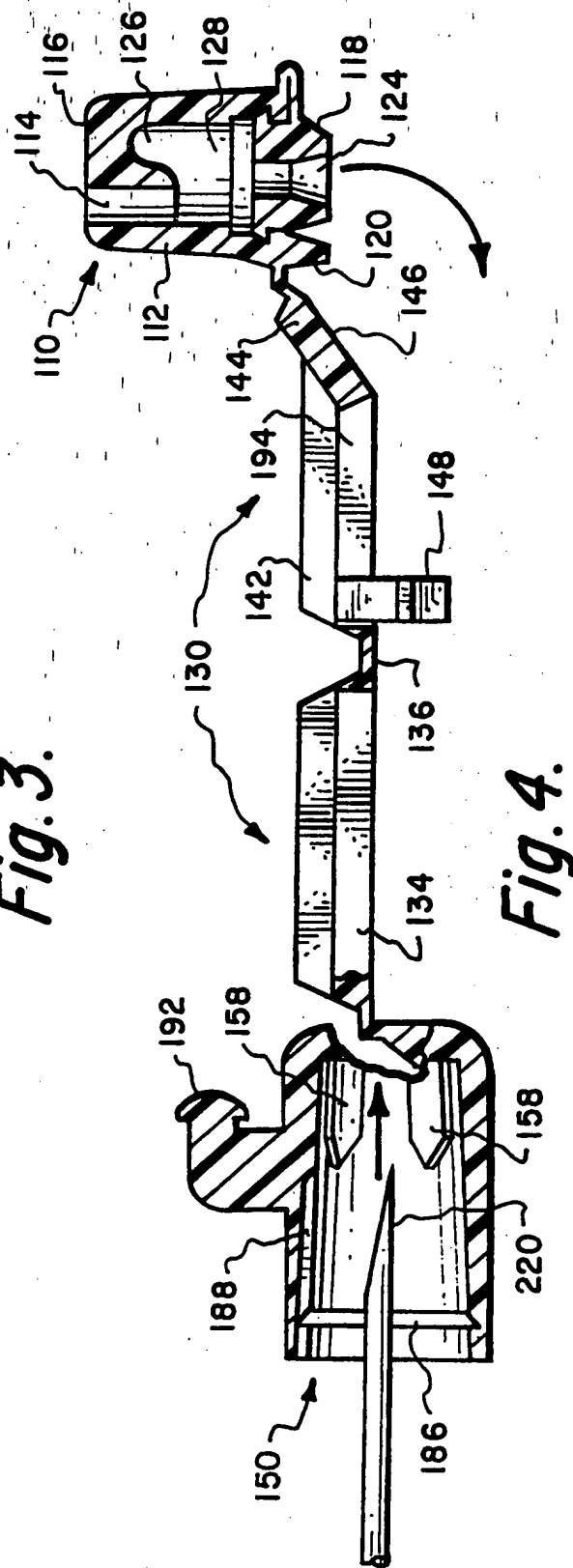
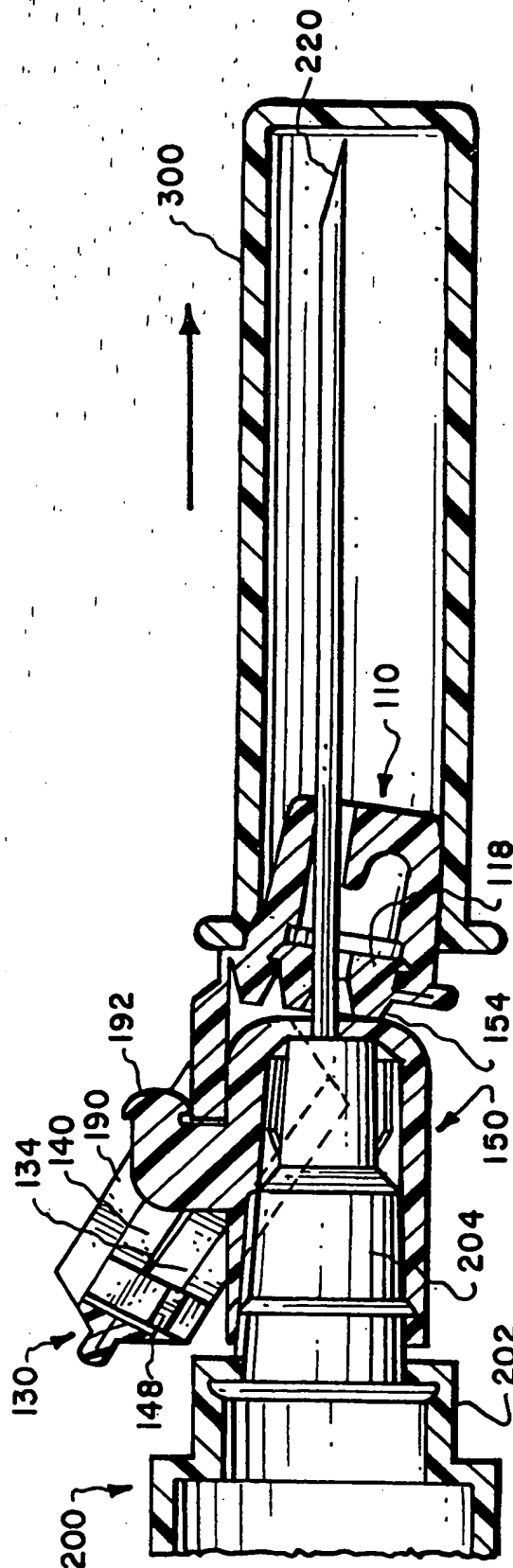
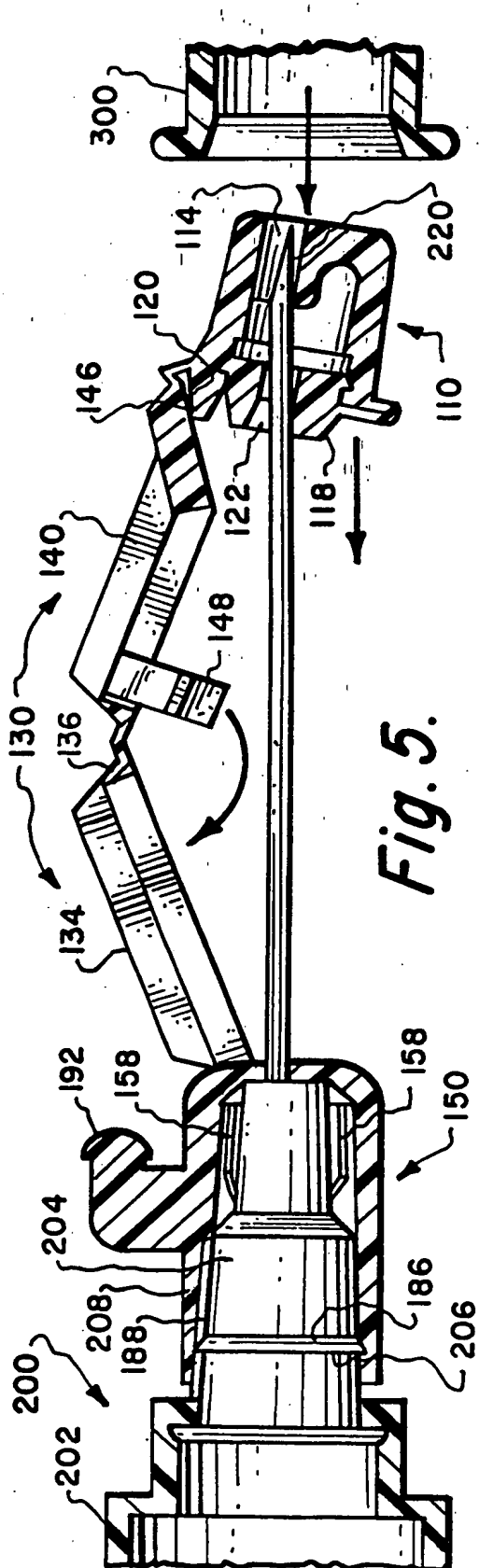
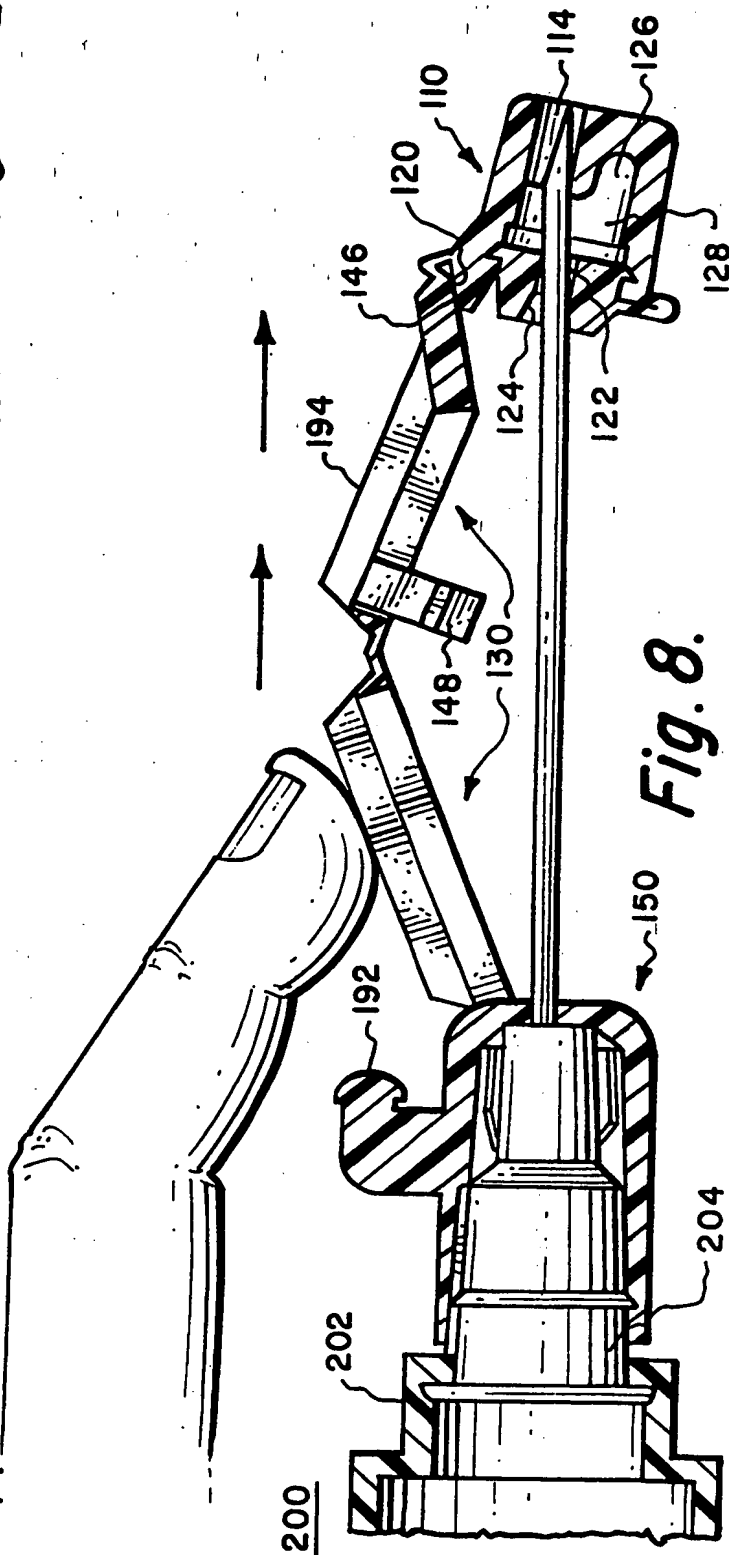
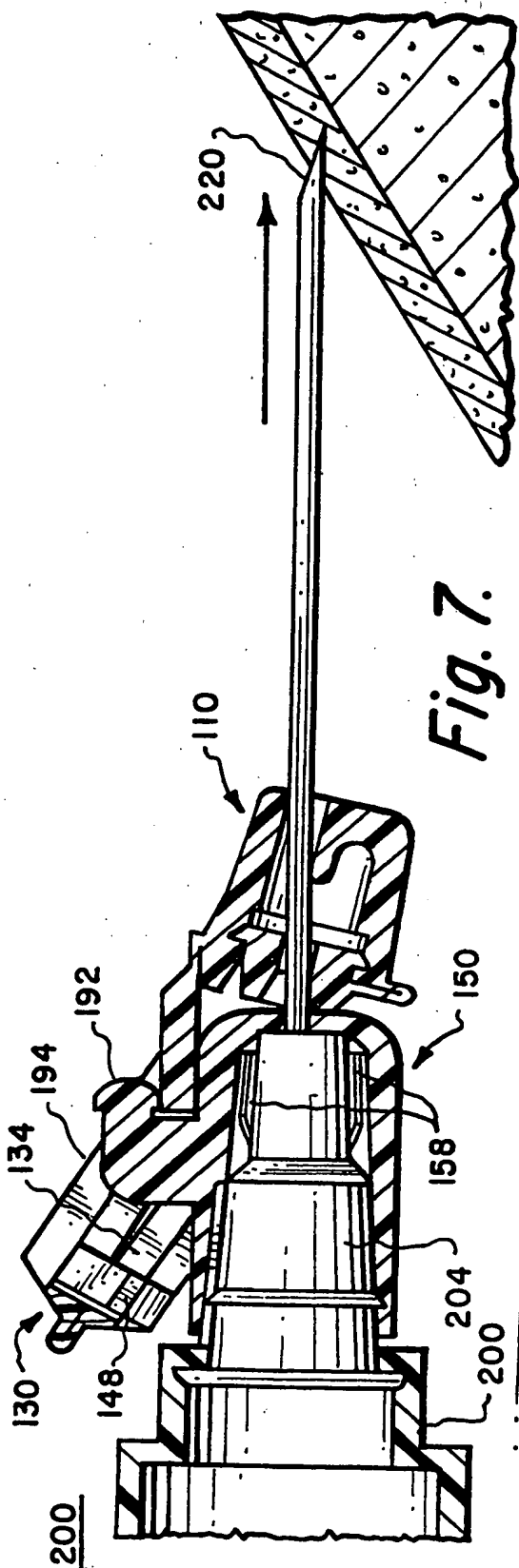


Fig. 4.





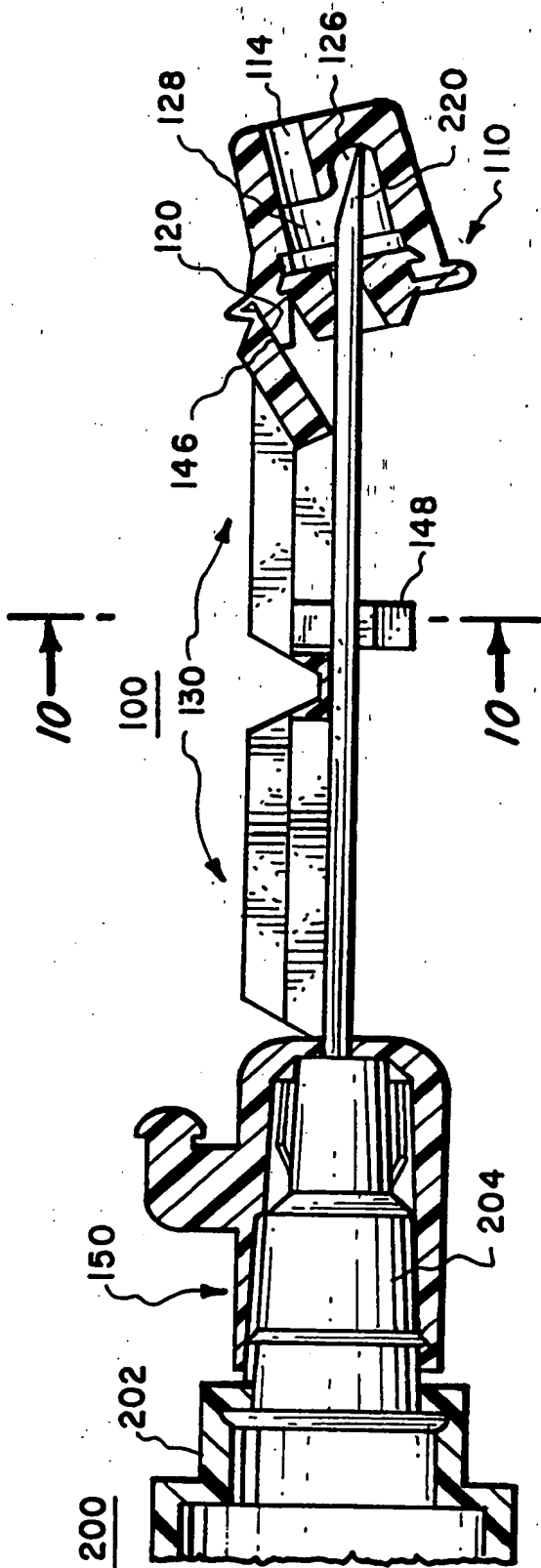


Fig. 9.

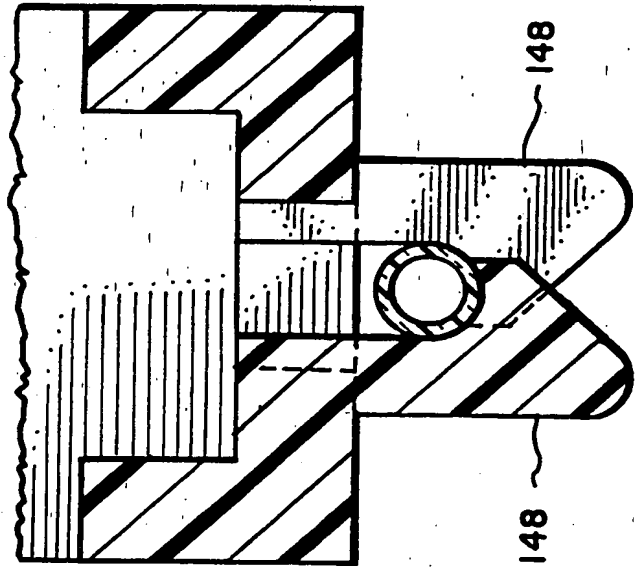


Fig. 10.

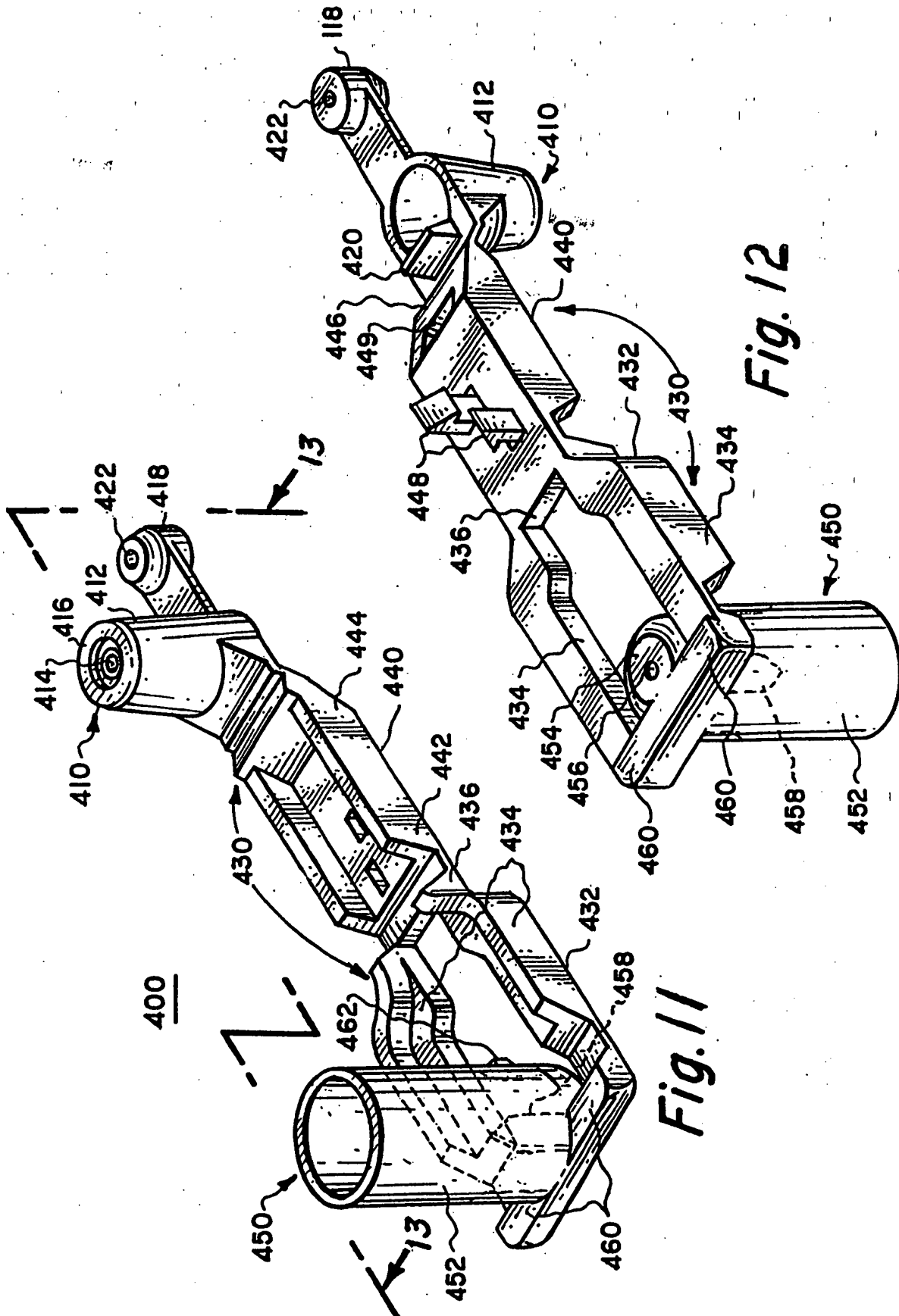


Fig. 11

Fig. 12

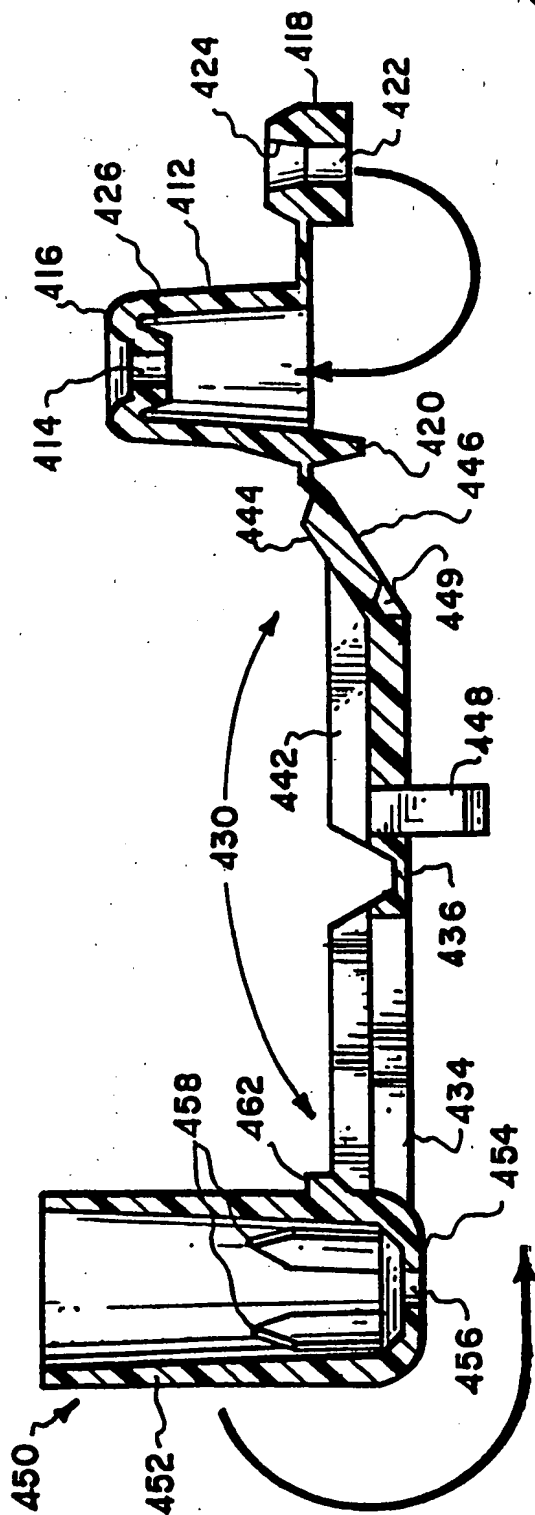


Fig. 13

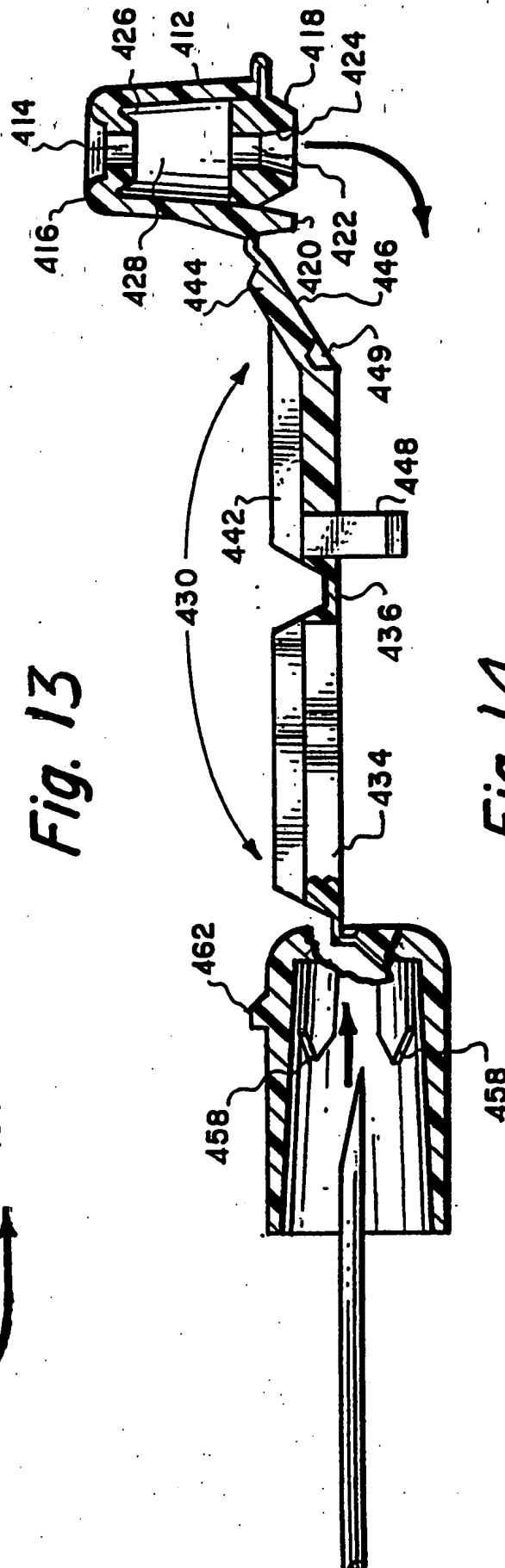
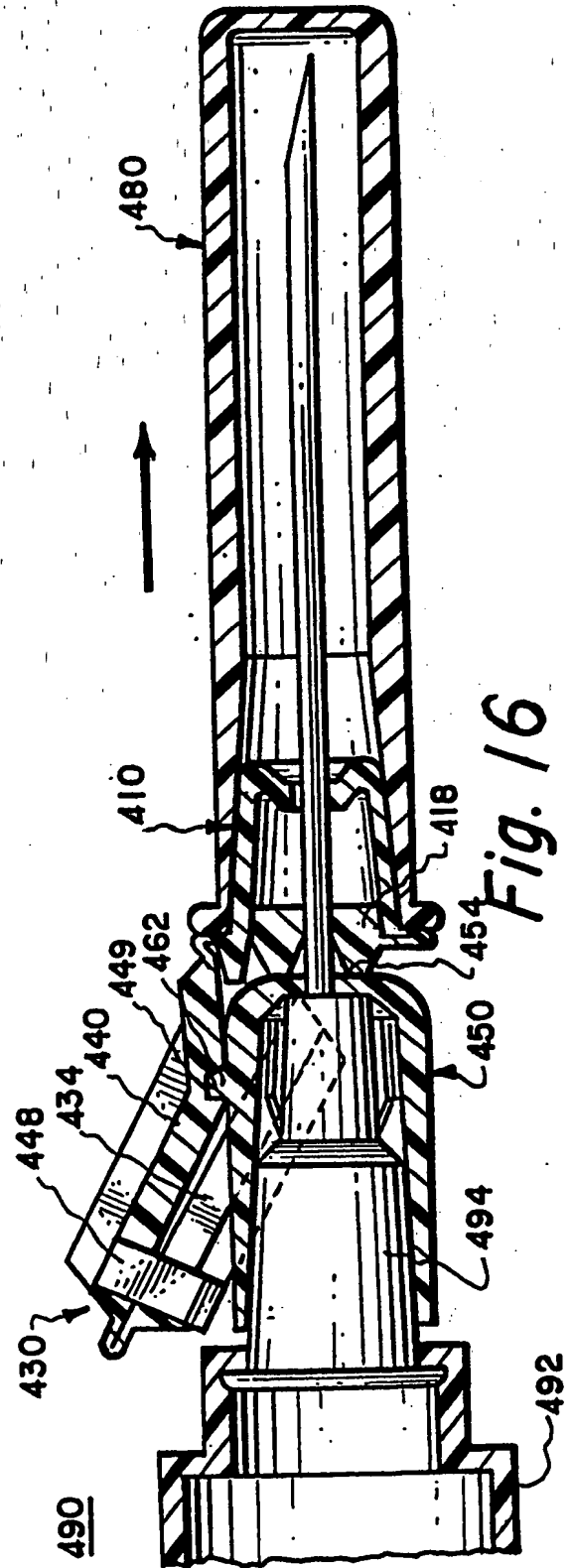
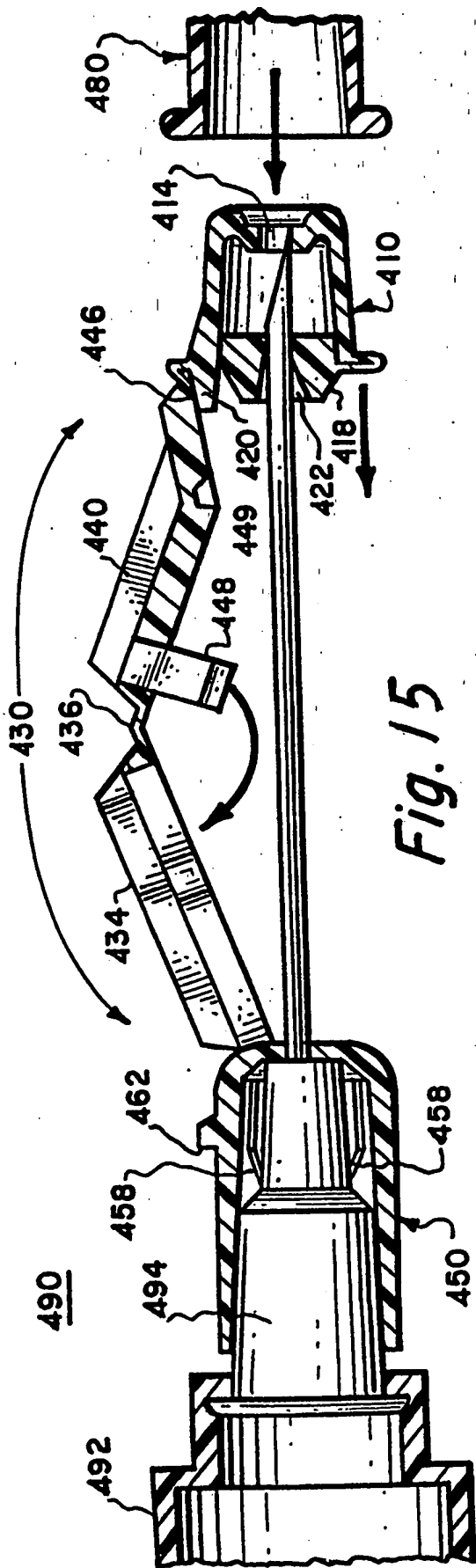


Fig. 14



INTERNATIONAL SEARCH REPORT

Inter national Application No

PCT/US 98/20176

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A61M5/32

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 A61M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 5 250 031 A (KAPLAN ET AL) 5 October 1993 see column 2, line 63 - column 4, line 60; figures 1-6	12, 15 1, 6, 16
X A	US 5 549 570 A (ROGALSKY) 27 August 1996 see column 2, line 43 - column 3, line 24; figures 1, 2	12-14 16
X A	GB 2 283 429 A (JENKINS DAVID HOWELL) 10 May 1995 see page 5, line 15 - page 8, line 8; figures 1-6	16 1, 3-5, 12, 13
E A	US 5 814 018 A (ELSON EDWARD E ET AL) 29 September 1998 see column 4, line 16 - column 7, line 45; claim 27; figures 1-9	20 1-19
	-/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search

25 May 1999

Date of mailing of the international search report

04/06/1999

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Authorized officer

Levert, C

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 98/20176

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 344 606 A (HABLEY MEDICAL TECHNOLOGY CORP) 6 December 1989 see page 3, line 42 - page 5, line 21; figures 1-5 ----	5,7,8, 14,18,19
A	US 5 735 827 A (ADWERS ET AL) 7 April 1998 see column 3, line 14 - column 4, line 59; figures 1-4 ----	1,11,17
A	US 4 892 521 A (LAICO ET AL) 9 January 1990 see column 4, line 11 - column 5, line 31; figures 1-4 -----	1,2,17, 18

INTERNATIONAL SEARCH REPORT

ational application No.

PCT/US 98/ 20176

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority; namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International Application No. PCT/ US 98/20176

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210.

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1,2-11,17-19

Needle point guard safety cap assembly with lid having a hole.

2. Claims: 12,13

Needle point guard safety cap assembly with a well chamber.

3. Claim: 14

Needle point guard safety cap assembly with interlocking members on the syringe attachment member and extensible frame.

4. Claim: 15

Needle point guard safety cap assembly with securing clip to engage the needle shaft.

5. Claim: 16

Needle point guard safety cap assembly with fulcrum, lever arm and pressure platform.

6. Claim: 20

Needle point guard safety cap assembly with collapsible segmented extension having a wishbone segment.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 98/20176

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5250031	A	05-10-1993	NONE	
US 5549570	A	27-08-1996	US 5425720 A	20-06-1995
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			EP 0726787 A	21-08-1996
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			US 5700249 A	23-12-1997
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			CA 2214174 A	26-03-1998
			EP 0838227 A	29-04-1998
			JP 10099436 A	21-04-1998
			SG 50882 A	20-07-1998
US 4892521	A	09-01-1990	NONE	

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